

# SANITARY COMMISSION.

No. 28.

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## ADVICE AS TO CAMPING,

BY THE

BRITISH GOVERNMENT SANITARY COMMISSION.

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NOTE.—“In consequence of the frightful mortality by disease, the British government sent out a Sanitary Commission to the Crimea. The soldiers had been dying like rotten sheep. Late in 1854 they died at the rate of 33 per cent. a year. The rate afterwards increased so fearfully, and rose so high, that if it had continued, and if recruits had not been continually poured in to fill the dead men's places, the whole army would have perished in less than a year.

“In consequence of active, wise, and resolute efforts the number of deaths immediately began to lessen, and continued to lessen until, in the first quarter of 1856, the rate of mortality was as low as it is usually among men of the army ages in the most healthy rural districts of England.

“Let us now look at the condition of the recruits in our encampments. They are said to be in good health. Of course they are, for they are fresh from their various wholesome callings. As time is necessary to form an army, so it is to breed an epidemic; and the processes for both are in active operation.”—[From a letter on sanitary condition of the troops about Boston, by S. G. Howe, M. D.]

The practical conclusions derived from the investigations of the British Sanitary Commission were published in an official report, from which the following advice respecting the location, arrangement, and police of camps is taken and respectfully urged upon the attention of the surgeons and officers of the army of the United States.

## PRACTICAL CONCLUSIONS RESPECTING CAMPS.

### I.

That by far the greater part of the disease and mortality existing in the camp, when the Commission arrived in the Crimea, was due to zymotic maladies, such as cholera, fever, diarrhœa, and dysentery.

That besides the effects of topographical and climatic peculiarities connected with the occupation, and making allowance for the predisposing influence of other conditions, to which the troops had been exposed, the prevalence of zymotic maladies was obviously connected with local favoring causes essentially the same in kind as those observed in civil life, especially in rural districts, namely:

Damp.

Impure air.

(Although in a minor degree) impure water.

### II.

Attacks of zymotic disease were observed to be connected with the three following sources of dampness:

A wet subsoil; a retentive surface soil; confined locality.

1. Of these three conditions, *a wet subsoil* occasioned the largest proportional amount of sickness.

The experience of the 79th Regiment, and that of the 31st and Royal Artillery, who were successively camped on the same ground, below Marine Heights, proves that one of the worst sites for a camp is that in which a thin bed of porous material rests upon an impervious bed beneath, which retains the water, and keeps the subsoil charged with it, while the surface may afford little or no indication of the fact.

Dangerous sites of this kind were often marked by a greener or more vigorous vegetation than that of the surrounding district, or by water-springs coming to the surface, or by evening fogs settling over them sooner than over the adjacent country.

Before selecting positions for camps in unknown ground, it would be very advisable to dig trial holes a few feet deep, to ascertain what is the condition of the subsoil drainage, and not to risk the health of the men in camping on ground in which these trial holes show the presence of water near the surface.

Should it be necessary, for military reasons, to hold a position on a wet subsoil, the whole should, if practicable, be thoroughly drained by deep trenches, and if there be a hill-side or water-shed above the ground, the surface water from it should be turned aside from the site by deep, catch-water drains, as was done with the camp of the Highland Division at Kamara.

If the position be such that deep trenching and draining cannot be carried out, it is in the highest degree probable that if held for any length of time, it will be at a considerable sacrifice of force.

2. *The retentive character of clay surface soils*, and the difficulty of draining such soils, render it advisable to avoid them as camping-grounds, when it is possible to do so.

Wet clay soils keep the air near the ground damp and cold, and they affect the atmosphere of tents and huts in a similar manner. There was sufficient proof of their injurious effects on the health of troops in the Crimea.

Where such soils must be occupied, for military reasons, the defects in the natural drainage should be remedied, as far as practicable, by trenching the ground, and by trench-



ing the site of every hut and tent separately, connecting the hut and tent drains with the larger trenches. In this way, not only are the sites and the vicinity of the huts and tents kept comparatively dry, but the surface water is more readily removed, the exhalations from the damp soil diminished, and the air purified. The experience of the army in the Crimea showed the very beneficial effects of this surface drainage and trenching on the health of the troops.

3. *Dampness of the air, arising from the nature of the locality*, proceeds from the topographical peculiarities of the ground preventing a free circulation of the air, and the atmosphere becoming stagnant, and charged with moisture and emanations from the ground. The valley of Karani, above Kadikoi, afforded an illustration of this, in certain states of the weather.

It was observed in other parts of the seat of the war in the East, that damp white mists, settling in valleys or hollows occupied by troops, had been the precursors of epidemic diseases, especially of cholera. All valleys are at times exposed to similar occurrences, especially such as contain stagnant lakes. An unhealthy and stagnant state of the air is sometimes increased by brushwood or trees.

There is often no escape from epidemic sickness occurring among troops from the occupation of such positions; they should, therefore, be avoided or abandoned.

### III.

The evils resulting from these local causes of dampness were not unfrequently aggravated by the manner of pitching tents and erecting huts. Want of due preparation of the ground, and defective drainage of the site, often led to a



damp state of the air within huts and tents, and induced a tendency to fevers.\*

Deep trenching round the tent site, as already mentioned, is the best remedy ; and in the case of huts, the site should be isolated from the surrounding ground, and the area to be occupied by the hut drained by a trench dug round it at least a foot below the level of the floor.

If it be not practicable to drain the subsoil, and if the position must be held, adequate provision should be made, with any materials at hand, for raising the beds of the men above the ground.

Huts should never be banked up with earth against the wood. The experience in the Crimea has shown that it is a dangerous practice, for it used to be a common cause of fevers.† An interior lining, even of old newspaper, affords a much better, and at the same time a perfectly safe protection from drafts.

The flooring of huts should be occasionally raised, the surface of the ground below cleansed, and quick lime and charcoal strewed over it.

For hospital huts, an interior lining of boards, or building a rough rubble stone wall outside, as was done in many of the regimental hospitals, affords the requisite protection from weather and from sun heat.

\* Tents in the camps of our volunteers are at present (September, 1861,) universally crowded too closely together. No tent should ever be placed within two full paces of another. Camp streets should never be less than five paces wide. (See U. S. Army Regulations, par. 506.) These being minimum distances, should be largely increased wherever practicable.—F. L. O.

† The practice adopted in some of our regiments of excavating the ground to be covered by the tents, in order to get warmer quarters at the beginning of the cold season, is equally injurious, and ought to be strictly prohibited. A sufficient supply of blankets for the night, and great camp-fires, which purify the atmosphere, dry the ground, and warm the men, by day, keeping them at the same time out of their crowded and ill-ventilated shelters, are, by far, better means for making them feel comfortable than sinking the tent floor.—G. A.

## IV.

The camp before Sebastopol was, generally, remarkably clean when first visited; but there were in certain situations sources of atmospheric impurity, from putrescent organic effluvia, likely to influence injuriously the health of the troops. The chief of these were :

Picketting-grounds, and manure heaps.

One or two slaughtering-places, and latterly the large cattle depot and slaughtering-place at Kadikoi.

The graveyards and putrid marsh near Balaklava.

Latrines kept too long open, and exposing too large a surface.

When an army can shift its ground at will, danger to health from similar evils can always be avoided by doing so.

When, on the other hand, an army is tied to its position for a length of time, the camp becomes a town, and is subject to all the sanitary defects of towns, as these existed before the introduction of the first great step that was taken for improving the public health, namely, the introduction of paving.

Picketting of horses saturates the ground they occupy with organic matter. In like manner, accumulations of manure, if allowed to remain, saturate the ground they cover. Filth of any kind is washed into the ground by the rains, or trodden into it by the steps of men and animals, and must necessarily give off impure emanations under the joint action of sun heat and moisture.

To avoid the injurious consequences likely to arise from these circumstances, it is indispensably necessary to observe the most scrupulous cleanliness over the whole surface and vicinity of a camp. All refuse should be at once swept up,

and removed to a distance. None should ever be allowed to accumulate within, or in the immediate vicinity of a camp.

Bones and refuse of food can be most easily disposed of by burial.

Stable litter and all inflammable refuse should be carefully burned. The usual method of forming heaps of litter, and firing it, is imperfect. Before being fired, it should always be opened up, to admit the air to dry it, and to expedite the combustion. Manure heaps burn with difficulty if left on the ground for any length of time before they are fired.

Carcasses of animals and offal should be buried to a sufficient depth below the surface. Three feet is enough under ordinary circumstances. Refuse charcoal dust thrown over tainted ground will assist in deodorizing it, or, if that be not attainable, the burning of stable litter on the spot will furnish sufficient charcoal for the purpose.

Latrines should be made narrow and deep ; a quantity of earth should be thrown into them each day, until they are filled within two feet of the surface, after which the latrine should be filled up, and another dug.

When an army requires to occupy the same surface of ground for years, it would be unsafe to bury the refuse in the ground, because eventually the soil would become saturated with organic matter, and dangerous to health.

In such a case, the construction of furnaces to consume every organic product of the camp is by far the best and safest proceeding. Speedy collection, removal, and destruction by fire of all such refuse matters, obviates any risk of danger from them.



*Atmospheric impurities, arising from overcrowding and defective ventilation of tents and huts,* were a frequent predisposing cause of zymotic disease.

Were it practicable in warfare to diminish materially the number of men sleeping in tents, it would be advisable to do so. But considering the limited transport at the command of an army in the field, the injurious consequences of overcrowding may, to a considerable extent, be obviated by a free ventilation of huts, and by improving the construction of tents and marquees, by introducing effectual means of ventilation round the top of the poles.

In the case of huts, ridge ventilation is the most efficient.

Lime-washing huts inside, especially hospital huts, purifies the air; lime-washing of huts outside protects them, to a certain extent, from the intense sun's rays, and keep them cooler within.

The usual practice of striking tents and shifting ground is an excellent means of avoiding the effects of saturation of the earth by emanations proceeding from the breath and bodies of the men.

\* The advice given by the commissioners in regard to the site, construction and ventilation of huts, cannot be too strongly insisted upon, as these structures are more permanent and fixed quarters than tents. Thousands of our soldiers will live in them during the coming winter. The desire to keep themselves warm, and ignorance of the vital necessity of an abundance of pure air, will make them unmindful of ventilation; and the sickness and mortality among our troops, from fevers, pulmonary complaints, &c., will certainly be fearful, if the lessons of the Crimean and other wars, in this respect, are not heeded by our commanders. No hut-barracks ought to be constructed and used as winter quarters, unless the site selected for them, their internal arrangement, and especially the means proposed for their ventilation, have received the approval of a Board of Advice, consisting of the best engineers and medical officers attached to the force.—G. A.

## VI.

The condition in which the water was drawn for use in the camp, was likely, especially during the prevalence of cholera, to aggravate the severity of the disease, although not to a great degree.

It is always desirable that water for drinking and cooking purposes should be, as nearly as possible, destitute of color, taste, or smell. Anything that interferes with these three natural tests is more or less injurious to health; but marsh water, however apparently pure, is not wholesome.

All engineering works for supplying camps with water should comprehend:

The selection of the purest obtainable source.

The delivering the water for use as pure as it is at its source.

If it be necessary to pound the water, the tanks should be covered.

Water should, if practicable at all, never be drawn by dipping, if it be rendered muddy in the act of being so drawn.

If a source of water of sufficient purity be not obtainable, the water should be filtered. A filter may be made with sorted gravel, clean sand, and charcoal.

Every trough for supplying horses should have a separate inlet and overflow.

GENERAL CONCLUSIONS FROM THE WHOLE  
EXPERIENCE.

## I.

That as scurvy, and the forms of disease connected with it, almost disappeared from the army under the influence of improved diet, clothing, &c., so, in like manner, zymotic diseases, the destructive effects of which mainly depend on breathing a humid, tainted atmosphere, declined on the carrying out of suitable sanitary works and measures.

## II.

That men just arrived in a new country are especially liable to suffer from prevailing zymotic maladies. That any given number of reinforcements will not compensate to the service for the loss of the same number of the original force from these diseases, and hence the necessity for effective sanitary precautions is doubly imperative, whether as regards the abatement of local favoring conditions, or the discovery and immediate treatment of the premonitory stages.

## III.

As the result of their whole experience, the Commissioners beg to express their opinion, that, inasmuch as the neglect of military *hygiène*, whether as regards the soldier personally, or the sanitary condition of camps, barracks, and hospitals, has hitherto, in all countries, climates, and seasons, been the cause of the largest amount of loss in armies, the whole subject, closely connected as it is with the physical efficiency of Her Majesty's forces, demands



in future a practical development commensurate with its importance to the public service.

We have the honor to be, my Lord, your Lordship's humble and obedient servants,

JOHN SUTHERLAND.

ROBERT RAWLINSON.

GAVIN MILROY.

The Right Hon.

LORD PANMURE, G. C. B., &c.,

*Minister at War.*

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